Financial Performance Evaluation of Selected CPSEs of India Through Dupont Analysis

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Abstract

The ability to create wealth for investors is one of the key performing indices of a business entity. Return on equity (ROE) measures this index, and DuPont analysis facilitates a critical evaluation of ROE. The present study attempted to establish the impact of DuPont factors on ROE and evaluated the financial performance of the selected companies. The empirical study was carried out on the financial data of three Maharatna central public sector enterprises doing business in the Indian fuel sector: Hindustan Petroleum Corporation Limited (HPCL), Indian Oil Corporation Limited (IOCL), and GAIL (India) Limited. Data were derived from the annual reports for a period of 10 years, from 2010–11 to 2019–20. Multiple linear regression was used to assess the degree of influence of DuPont factors on ROE. The results showed that the net profit margin of all the companies had more impact on ROE rather than the total asset turnover and equity multiplier. The results also proved that GAIL (India) Limited is a favored company for investors among the three companies considered in terms of consistency in ROE.

Keywords : **CPSE, DuPont analysis, equity multiplier, net profit margin, return on equity, total asset turnover**

JEL Classification Codes : E22, G30, G31, M41

Paper Submission Date : May 20, 2021 ; Paper sent back for Revision : January 30, 2022 ; Paper Acceptance Date : February 20, 2022 ; Paper Published Online : May 15, 2022

The success of a business depends more on its financial management. A financial performance evaluation assesses how well a company maintains its funds to achieve its objectives over a specified period. Financial performance is a matter of interest to certain groups such as investors, lenders, competitors, the government, and the company's management. Performance evaluation involves the analysis and interpretation of financial statements, including balance sheet, income statement, and cash flow statement, in such a way that it undertakes a full diagnosis of the profitability and financial soundness of the business. Analysts use several tools and techniques to develop a fair understanding of a company's financial performance over a period. Some of them include traditional methods like horizontal analysis, vertical analysis, ratio analysis, trend analysis, and DuPont analysis, and modern methods such as economic value added (EVA), market value added (MVA), the balanced scorecard, and activity based costing (ABC), etc.

The present study aims to conduct the financial performance evaluation of Hindustan Petroleum Corporation Ltd. (HPCL), Indian Oil Corporation Ltd. (IOCL), and GAIL (India) Limited (GAIL), and in particular, aims to study the ROE of the companies and the factors affecting it. The study is carried out to assess the impact of DuPont

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DOI : https://doi.org/10.17010/ijf/2022/v16i5/169517

factors on ROE and estimate the financial performance based on return on equity for the period from 2011 – 2020. IBM SPSS 22 is used for statistical computations. A multiple linear regression model is used to establish the impact of DuPont factors on the return on equity.

The energy and fuel supply sector remain any country's lifeline because it triggers economic growth. This sector's continued and profitable existence is important to sustain economic growth. In this context, the present work has importance in the interest of the Indian economy, common investors, and the companies' management. The selected public sector units are among the fuel and energy supply majors operating in India, and as already mentioned, their healthy existence is essential for the Indian economy. Concerning common investors, they need manifold returns on their investments in the scenario of liberalized economic policies. This study will help potential investors identify the company with the highest ROE and plan their investments. On the other hand, the study outcomes will enable the respective managements to understand what factors influence the ROE the most. This understanding enables the management to plan better ways to enhance ROE and attract more potential equity investments.

The sampling selection of the three select companies for the study is based on the factors that they belong to central public sector enterprises and are the major contributors to the central exchequer, and are more capital intensive. There are seven energy and fuel CPSEs listed under the Maharatna category: Bharat Petroleum Corporation Limited (BPCL), Coal India Limited (CIL), GAIL (India) Limited, Hindustan Petroleum Corporation Limited (HPCL), Indian Oil Corporation Limited (IOCL), NTPC Limited, and Oil and Natural Gas Corporation Limited (ONGC). The present study is confined to three CPSEs in the energy and fuel sector. Hence, HPCL, IOCL, and GAIL (India) Limited were purposely selected because of the brevity of the study.

Theoretical Framework

DuPont Analysis

Return on equity (ROE) is a key performance indicator that is calculated by dividing the net income by shareholders' equity. According to Burja and Mărginean (2014), DuPont is a mathematical model representing a factorial analysis of profitability from the financial return on equity, ROE. A simple calculation of ROE reveals plenty regarding the health of the company. However, it doesn't essentially offer a complete picture. A higher ROE is always ideal because it indicates a positive sign that the corporate is adding returns to common shareholders. However, one cannot draw conclusions relying exclusively on ROE because a company might have opted for excessive debt and inexplicably increased its equity returns. In this regard, the DuPont analysis proves to be a superior tool for understanding the dynamics of ROE. Frank Donaldson Brown, an employee of DuPont's Treasury Department, developed the DuPont model of return on equity in 1920. It breaks down the calculation of ROE into three parts, namely net profit margin, total asset turnover, and equity multiplier. Net profit margin depicts the efficiency of the management in generating the profits from the sales. The asset turnover ratio projects the efficiency with which a company is using its assets to generate revenue. The equity multiplier, a measure of financial leverage, permits the investor to examine what portion of the ROE is obtained from debt. If a company's ROE is less than its peers, the three-step identities will help show where the company is lagging. It also shows how an organization is lifting or shoring up its ROE. Thus, DuPont analysis helps in getting a clearer understanding of ROE.

The DuPont model is built on the following three components, which cover the areas of profitability, operating efficiency, and leverage.

(1) ***Net Profit Margin (NPM)***. Net profit margin is the percentage of net income resulting from the company's

operating activities. It is the percentage of residual income after all direct and indirect expenses, including interest and taxes, are deducted from sales. As such, it is one of the most trusted key performance indicators. When NPM is high, it reflects that the company is exercising better control over the costs and its pricing policy holds good. As NPM is a part of ROE calculation, the higher the NPM, the higher will be the ROE.

(2) ***Total Asset Turnover Ratio (TAT)***. Total asset turnover is a relative measure of a company's revenue to the value of its assets. It reflects how efficiently the company is using its assets to generate revenue. The higher the TAT, the higher the revenues will be.

(3) ***Equity Multiplier (EM)***. Financial leverage or equity multiplier is a risk indicator that explains the company's dependency on debt. High EM means the company is more dependent on debts to finance its assets, which is not a very good performance indication. Similarly, low EM indicates that the company uses more equity than debt in asset making.

$$ROE \quad \frac{Net\ Income}{Shareholder\ Equity}$$

The DuPont analysis decomposes ROE into three components, facilitating the analysis of key components contributing to ROE.

$$ROE = \frac{Net\ Income}{Sales} \times \frac{Sales}{Total\ Assets} \times \frac{Total\ Assets}{Shareholders'\ Equity}$$

$$= Net\ Profit\ Margin \times Total\ Assets\ Turnover \times Equity\ Multiplier$$

Central Public Sector Enterprises

Central public sector enterprises (CPSEs) are those companies in which the direct holding of the Central Government or other CPSEs is 51% or more. They are the undertakings wholly or partly owned and controlled by the government. Their contribution is significant in achieving balanced, diversified, and uniform economic growth in the post-independent era. In those days, private investments were only budding in the country, and CPSEs were the only option in huge capital-intensive sectors like iron and steel, cement, fertilizers, electricity, petroleum, and communications. They operate with a service motive rather than profit. Based on the turnover, average annual net worth, profitability, etc., CPSEs are grouped into Maharatna, Navratna, and Miniratna companies. Each group is awarded varying financial autonomy by the government. As of January 2020, there are 10 Maharatnas, 14 Navratnas, and 74 Miniratnas under categories – I and II.

In the present study, three Maharatna CPSEs hold a major part in the fuel sector of India: Hindustan Petroleum Corporation Limited (HPCL), Indian Oil Corporation Limited (IOCL), and GAIL (India) Limited, whose brief profiles are as follows.

(1) ***Hindustan Petroleum Corporation Limited (HPCL)***. Hindustan Petroleum Corporation Limited (HPCL) was formed on July 15, 1974. It is now at 54th place in S & P Platts Top 250 Global Fuel Company Rankings. It deals with the refining and marketing of petroleum products in India and abroad. The company operates through downstream petroleum and other segments. Its business activities include trading petrol, diesel, kerosene, liquefied petroleum gas, naphtha lubricants, greases, etc., for the domestic market and importing and refining

crude oil. They also operate pipelines for the transport of petroleum products. HPCL is also engaged in retail business through petrol outlets across India and trades gas fuel under HP for supply to household, commercial, and industrial consumers. HPCL has the second-largest share of product pipelines in India, with a pipeline network length of 3,775 km.

(2) ***Indian Oil Corporation Limited (IOCL)***. Indian Oil Corporation Limited (IOCL), India's flagship national oil company and downstream petroleum major, was incorporated on June 30, 1959, as Indian Oil Company. The company was renamed Indian Oil Corporation on September 1, 1964, following the merger of Indian Refineries (established 1958) with it. It is now at 19th place on S&P Platts Top 250 Global Fuel Company Rankings. IOCL, together with its subsidiaries, engages in the import, refining, pipeline transportation, and marketing of petroleum products in India. It is also involved in the exploration and production of crude oil and gas and the marketing of natural gas and petrochemicals. The company's products include petrol/gasoline, diesel/gas oil, lubricants and greases, autogas, cooking gas, kerosene, LPG, bulk/industrial fuels, aviation fuel, marine oils, and bitumen. The company operates through a network of approximately nine refineries, 14,231 kilometers of crude/product and gas pipelines, approximately 27,702 fuel stations, including 7,857 Kisan Seva Kendra outlets, 125 terminals and depots, 91 LPG bottling plants, 116 aviation fuel stations, 6,960 consumer pumps, and approximately 11,964 LPG distributors. The company also exports its products.

(3) ***GAIL (India) Limited (GAIL)***. GAIL (India) Ltd. (GAIL) was incorporated on August 16, 1984, as a public limited company named Gas Authority of India Ltd. At the time of incorporation, all of the shares were held by the Government of India. Initially, the company started as a gas transmission company. They grew over the years by building an extensive network of natural gas trunk pipelines covering a length of 7,850 km. The company is a natural gas processing and distribution company in India and abroad. It is involved in the transmission, distribution, and marketing of natural gas to power, city gas distribution, fertilizer, and other sectors. Its products include liquefied natural gas (LNG), liquefied petroleum gas (LPG), propane, pentane, naphtha, mixed fuel oil, propylene, hydrogenated C4 mix, etc. The company owns and operates approximately 12,426 km of natural gas pipelines, a 2,038 km LPG pipeline transmission network, and five gas processing plants for the production of LPG, propane, pentane, naphtha, etc. It is now at 100th place in S&P Platts Top 250 Global Fuel Company Rankings.

Literature Review

Return on equity (ROE) is a key metric of financial performance. A simple calculation of ROE doesn't reveal a complete understanding of the company's health. Therefore, analysts depend more on DuPont analysis for better insights into the dynamics of ROE. It helps the analysts to break ROE into net profit margin, total asset turnover, and equity multiplier and offers a better and deeper analysis. Chang et al. (2014) said that DuPont analysis is a common and straightforward method for assessing factors that influence a firm's financial performance and has been widely adopted in practice since its development. Almazari (2012) studied the financial performance of the Jordanian Arab Commercial Bank for the period from 2000 – 2009 using the DuPont system of financial analysis and found that the financial performance of Arab Bank was relatively steady and reflected minimal volatility in return on equity.

Botika (2012) showed that a critical analysis of DuPont components indicated important forms of behavior of stocks. This understanding will help market participants in making their investment decisions. The study conducted on the Romanian market showed a strong dependence on cumulated abnormal returns, profitability, and ROA. Sharma and Gupta (2019) examined the effect of International Financial Reporting Standards (IFRS)

on the profitability of companies that adopted it. The study was carried out on data obtained from 29 companies from developed countries and 27 companies from developing countries. The study was carried out on cross-sectional time-series data and applied the panel data technique. The study revealed that the adoption of IFRS had a significant impact on the profitability of the companies, but it had no significant difference between developed and developing countries. Dehning and Stratopoulos (2002) selected the Computerworld Premier 100 (CWO100) list for the years before 1994 and examined whether the use of information technology (IT) provided companies with superior performance relative to their direct competitors about profitability and efficiency. Using DuPont analysis and a matched pair design, they found that the successful use of IT pays off in a combination of increased profitability and efficiency.

Bothra and Gupta (2020) conducted a DuPont analysis to examine the major contributor among the three components of profitability, asset efficiency, and financial leverage to the return on equity (RoE). The study was carried out through a comparative study between luxury industries and non-luxury industries. The study claimed that the major contributor to RoE was the asset turnover ratio (ATR) in the case of both luxury industries as well as non-luxury industries. Budhedeo and Pandya (2018) evaluated the financial performance of Indian public sector banks. The study was conducted by comparing the performance in two periods, from 1995 – 2007 (post-economic reforms period) and 2007 – 2017 (post-global crisis period). The comparative study evidenced that the financial performance of public sector banks was better with positive trends in the first phase and poorer with falling trends in the second phase of the study period. Chakraborty (2017) conducted a study to assess the financial soundness of 18 life insurance firms in India from 2008 – 09 to 2014 –15 in the backdrop of U. S. financial crisis. The study used the ratio-based CARAMELS framework. The study found that the private life insurers showed a better performance despite the state-owned LICI domination despite the ill effects of the global financial crisis on the life insurance sector in the country.

Turner et al. (2015) evaluated the drivers of profitability by considering a sample size of 3, 255 U. S. hospitals between 2007 and 2012. By applying the DuPont analysis as a framework, they investigated the quality of earnings of said hospitals and found that investor-owned hospitals had higher profit margins, higher efficiency, and were substantially more leveraged. Gupta and Jaiswal (2020) carried out a comparative analysis of the financial performance in respect of financial stability, liquidity, profitability, and other financial aspects of selected public and private sector banks. The study revealed that the public sector banks were good enough to make significant progress but could not meet the performance benchmark set by the private sector banks. Thus, the study concluded that the private sector banks were more successful in controlling the non-performing assets compared to the public sector banks.

Nagaraju (2014) analyzed the performance of Indian public and private banks from 2006 – 2010 through the application of data envelopment analysis on 34 banks. The study found that the selected banks underperformed in terms of marketability and profitability during the study period. But comparatively, they exhibited a better performance in terms of profitability efficiency than the marketability efficiency. Doorasamy (2016) measured the financial performance of the food industry by taking the top three JSE listed companies, namely Pioneer Foods, Tiger Brands, and RCL foods, for the period between 2013 and 2014 by applying the DuPont analysis and concluded that investing in Tiger Brands would generate a higher return to shareholders than the remaining companies.

Chitta et al. (2019) studied the financial soundness of eight Maharatna companies from 2014 – 2018. The study applied the Altman *Z* - Score model to assess the possible financial failure of the selected companies. The study revealed that some Maharatna companies did not show the expected performance. Budhedeo and Pandya (2020) examined the results of liquidity management of selected Indian banks during pre and post-financial crisis periods, that is, 2001– 02 to 2007– 08 and 2008 – 09 to 2018–19. The authors identified that the banks experienced severe financial problems during the crisis periods despite having adequate levels of capital reserves. The banks

cautiously adopted higher liquidity strategies in the post-crisis period and were able to grow the business at a slower rate.

Objectives of the Study

The present study is formulated to :

- Assess the impact of DuPont factors on ROE.
- Examine the degree of relationship among DuPont factors.
- Estimate the financial performance based on ROE.

of selected three companies in the Indian fuel sector for a period of 10 years from 2011 – 2020.

Research Methodology

Methodology

The analysis aims to find the impact of DuPont factors on ROE, establish the relationship among the DuPont factors, and estimate the financial performance of the select companies for the study period from 2011 – 2020. The study is carried out by finding DuPont ratios of the select companies, framing certain hypotheses for the relations among them, testing them on the data, and framing the results thereof. Based on equation (1), the following hypotheses are constructed to obtain the results :

- **H_{01} :** There is no significant impact of NPM on ROE.
- **H_{a1} :** There is a significant impact of NPM on ROE.
- **H_{02} :** There is no significant impact of TAT on ROE.
- **H_{a2} :** There is a significant impact of TAT on ROE.
- **H_{03} :** There is no significant impact of EM on ROE.
- **H_{a3} :** There is a significant impact of EM on ROE.

Statistical Model

The required secondary data has been derived from the annual reports of the selected companies. IBM SPSS Statistics 22 is used to perform different statistical tests. Karl Pearson's coefficient of correlation is used to assess the degree of relationship among DuPont factors. Multiple regression analysis allows assessing the strength of the relationship between an outcome (the dependent variable) and multiple predictor variables. It also reveals the importance of each of the predictors to the relationship, often with the effect of other predictors statistically eliminated. In this analysis, multiple linear regression is used to evaluate the impact of net profit margin, total asset turnover, and equity multiplier on the return on equity of each company during 2010 – 11 and 2019 – 20.

The regression model used in the study is :

Table 1. ***DuPont Ratios from 2011 – 2020***

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
HPCL										
NPM (%)	1.32	0.09	0.23	0.46	0.69	2.64	3.85	2.97	2.26	0.92
TAT	1.85	2.16	2.34	2.42	2.52	2.13	2.66	2.71	2.76	2.45
EM	5.23	6.46	6.79	6.91	6.11	5.05	3.81	3.51	3.53	3.77
ROE (%)	12.83	1.32	3.69	7.72	10.67	28.34	39.09	28.27	22.01	8.52
IOCL										
NPM (%)	2.76	1.03	0.96	1.45	1.09	3.15	4.49	4.39	2.80	–0.33
TAT	1.54	1.86	1.94	1.83	1.92	1.47	1.66	1.74	1.84	1.75
EM	3.10	3.53	3.70	3.86	3.34	3.13	2.63	2.55	2.93	3.42
ROE (%)	13.15	6.78	6.92	10.26	7.03	14.49	19.60	19.50	15.11	–1.95
GAIL										
NPM (%)	12.09	10.06	8.56	7.73	5.21	4.10	6.84	8.79	8.60	13.11
TAT	0.83	0.87	0.85	0.93	0.87	0.77	0.83	0.89	1.11	0.97
EM	1.85	1.97	1.98	1.95	1.95	1.92	1.51	1.47	1.49	1.52
ROE (%)	18.48	17.16	14.46	13.99	8.83	6.08	8.58	11.52	14.23	19.28

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + e \qquad (1)$$

where,

Y = ROE (Dependent variable),

β_0 = Intercept of the equation,

X_1 = *NPM* (Independent variable 1),

X_2 = *TAT* (Independent variable 2),

X_3 = *EM* (Independent variable 3),

β_1, β_2, β_3 = Coefficients of the corresponding independent variables,

e = Error factor.

Data Collection

As presented in Table 1, the relevant secondary data is derived from the annual reports of 10 years (2010 – 11 to 2019 – 20) accessed from the web portals of the respective companies.

Analysis and Results

The statistical test results of HPCL are summarized in Table 2 and Table 3. Table 2 reveals that the dependent variable ROE has a strong positive relationship with NPM (0.984) and a significant positive correlation with TAT (0.422). A strong negative relationship exists between ROE and EM (–0.713), which rejects the general principle

Table 2. ***Correlation Matrix for HPCL***

Ratio	*ROE*	*NPM*	*TAT*	*EM*
ROE	1	0.984**	0.422	–0.713*
NPM		1	0.403	–0.761*
TAT			1	–0.495
EM				1

Note. **Statistically significant at 1% level (2-tailed).

*Statistically significant at 5% level (2-tailed).

Figure 1. ***DuPont Factors of HPCL***

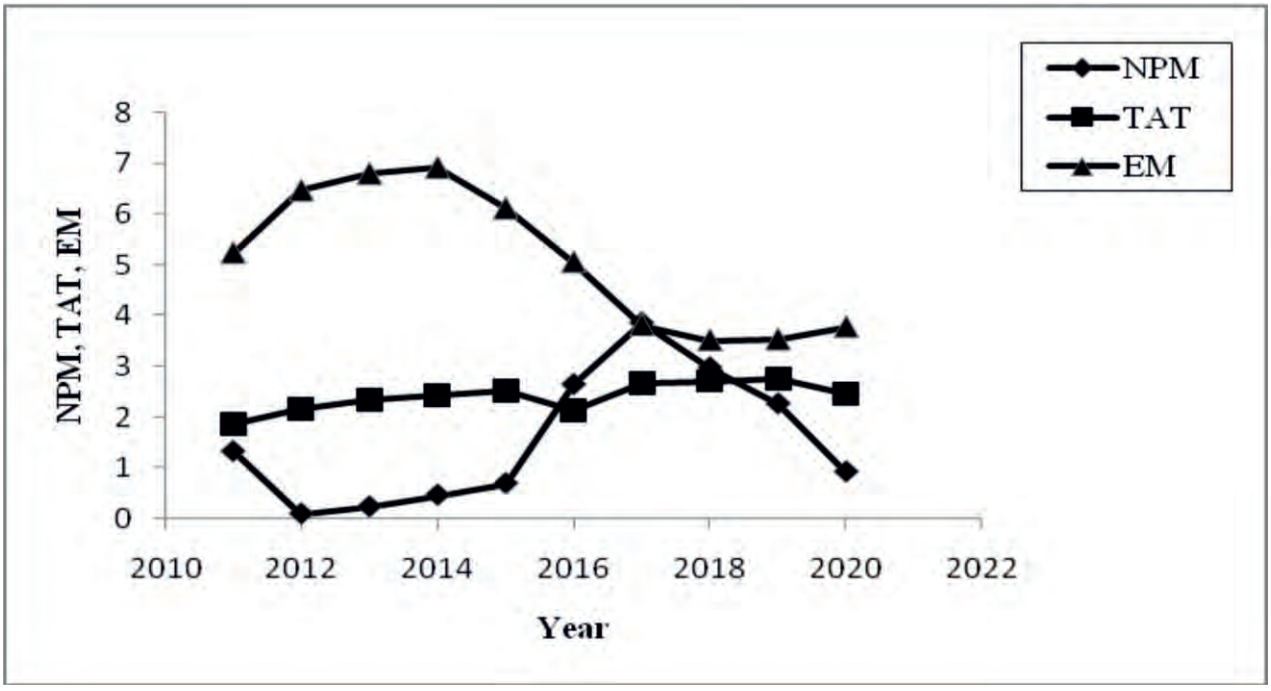

Table 3. ***Multiple Regression Analysis of HPCL***

Variable	Regression Coefficients	Standard Error	*t* - value	Significance (*p* - value) @ 5%
Constant (β_0)	–0.076	0.111	–0.686	0.518
NPM (X_1)	8.982 (β_1)	0.892	10.073	0.000
TAT (X_2)	0.023 (β_2)	0.033	0.696	0.512
EM (X_3)	0.010 (β_3)	0.010	0.993	0.359
Multiple Correlation Coefficient *R* = 0.986	Coefficient of Determination *R*-Square = 0.973	Adjusted *R*-Square = 0.959	Standard Error of the Estimate = 0.02487	ANOVA *F* - Statistic = 71.752 Sig. 0.000

Note. (Dependent Variable *Y* = ROE).

that the higher the EM, the higher the ROE. Similarly, the correlation among the DuPont factors may also be understood from Table 2 and Figure 1. There exists a strong negative correlation between NPM and EM (–0.761), a significant positive correlation between NPM and TAT (0.403), and TAT is also negatively correlated with EM (–0.495).

Table 3 presents the results of the regression analysis of HPCL. The constant –0.076 points out that if all the independent variables are zero, the ROE value will be –7.6%. The regression coefficient β_1 is 8.982, which means if NPM changes by one unit, ROE increases by 8.982 units, other variables being constant. β_2 and β_3 are 0.023 and 0.010, indicating a very low variation in ROE in response to a unit change in TAT and EM. The adjusted *R*-Square is 0.959, indicating that the model accounts for 95.9% of the total variability. *F*-stat (ANOVA) depicts that the overall model fits at a 5% significance level.

The statistical test results of IOCL are summarized in Table 4 and Table 5. As per Table 4, the ROE of IOCL also has a significant positive correlation with NPM equal to 0.954 and a negative correlation with both TAT and EM

Table 4. ***Correlation Matrix for IOCL***

Ratio	*ROE*	*NPM*	*TAT*	*EM*
ROE	1	0.954**	–0.395	–0.756*
NPM		1	–0.564	–0.878*
TAT			1	0.458
EM				1

Note. **Statistically significant at 1% level (2-tailed).
*Statistically significant at 5% level (2-tailed).

Figure 2. ***DuPont Factors of IOCL***

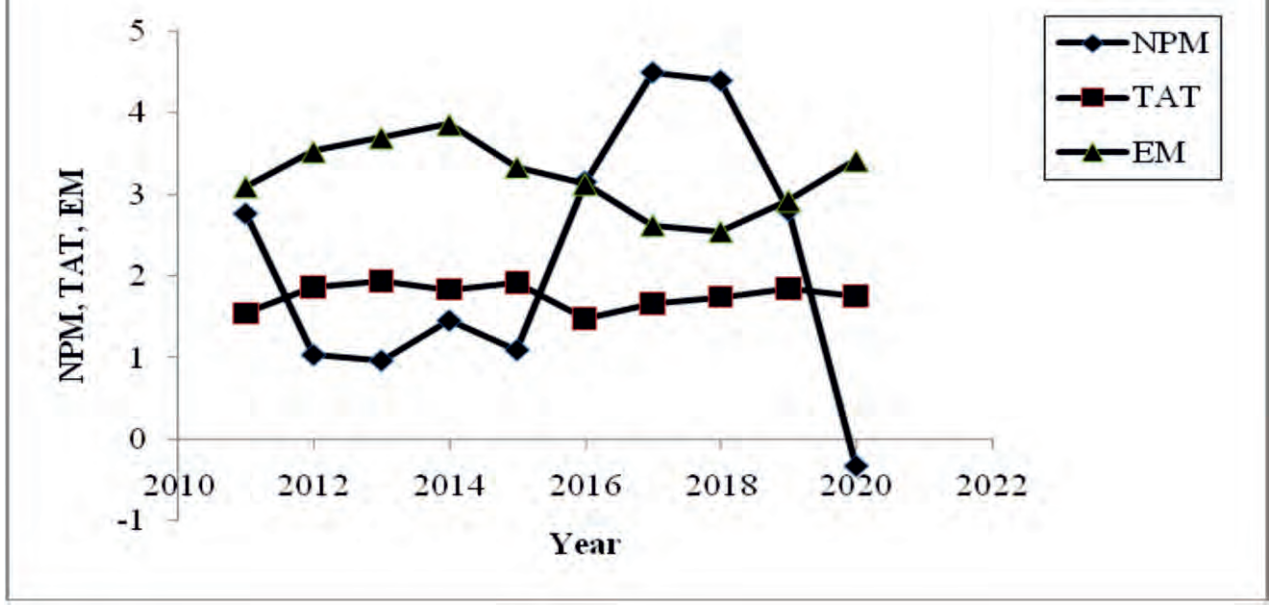

Table 5. ***Multiple Regression Analysis of IOCL***

(Dependent Variable *Y* = ROE)				
Variable	**Regression Coefficients**	**Standard Error**	***t* - value**	**Significance (*p* - value) @ 5%**
Constant (β_0)	–0.402	0.103	–3.904	0.008
NPM (X_1)	6.668 (β_1)	0.656	10.165	0.000
TAT (X_2)	0.099 (β_2)	0.033	3.044	0.023
EM (X_3)	0.062 (β_3)	0.020	3.032	0.023
Multiple Correlation Coefficient *R* = 0.988	Coefficient of Determination *R*-Square = 0.977	Adjusted *R*-Square = 0.965	Standard Error of the Estimate = 0.01262	ANOVA *F* - Statistic = 83.566 Sig. 0.000

equal to –0.395 and –0.756, respectively. As per Table 4 and Figure 2, the independent variables influencing the ROE of IOCL are also interrelated with each other. NPM is negatively correlated with both TAT and EM to the extent of –0.564 and –0.878. TAT is positively correlated with EM, equal to 0.458.

Table 5 presents the results of the regression analysis of IOCL. The value of ROE is around –40.2 % in the absence of all the independent variables. ROE changes by 6.668 units for a unit change in NPM by 0.099 units for a unit change in TAT and by 0.062 units for a unit change in EM. The adjusted *R*-square is 0.965, indicating that the model accounts for 96.5% of the total variability. *F*-stat (ANOVA) depicts that the overall model fits at a 5% significance level.

From Table 6, it is evident that the ROE of GAIL (India) Ltd. has a very high degree of positive correlation with NPM equal to 0.954 at a 1% significance level. ROE and TAT have a positive correlation equal to 0.410. A negative correlation exists between ROE and EM equal to –0.69, indicating that excessive use of debt will reduce ROE. NPM of GAIL is positively correlated with TAT and negatively correlated with EM equal to 0.373 and –0.298, respectively. TAT and EM have a negative correlation equal to –0.498. Figure 3 shows the graphical representation of DuPont factors calculated from the secondary data. Correlation among the DuPont factors evaluated by the correlation test is reiterated in Figure 3.

Table 7 presents the results of the regression analysis of GAIL. The value of ROE is around –18.4% in the absence of all the independent variables. ROE changes by 1.475 units for a unit change in NPM, by 0.093 units for a unit change in TAT, and by 0.060 units for a unit change in EM. The adjusted *R*-square is 0.989, indicating that the model accounts for 98.9% of the total variability. *F*-stat (ANOVA) depicts that the overall model fits at a 5% significance level.

Table 6. ***Correlation Matrix for GAIL (India) Limited***

Ratio	***ROE***	***NPM***	***TAT***	***EM***
ROE	1	0.954**	0.410	–0.069
NPM		1	0.373	–0.298
TAT			1	–0.498
EM				1

Note. **Statistically significant at 1% level (2-tailed).

Figure 3. ***DuPont Factors of GAIL***

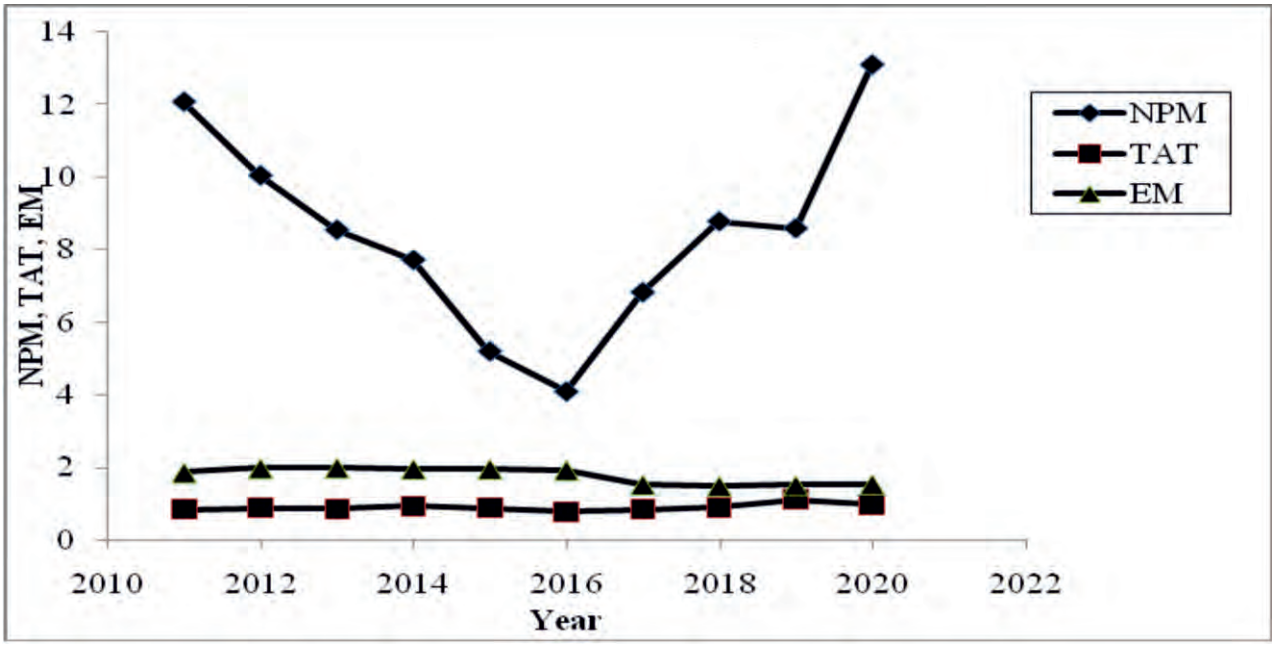

Table 7. ***Multiple Regression Analysis of GAIL (India) Limited***

(Dependent Variable *Y* = ROE)				
Variable	**Regression Coefficients**	**Standard Error**	***t* - value**	**Significance (*p* - value) @ 5%**
Constant (β_0)	–0.184	0.026	–7.080	0.000
NPM (X_1)	1.475 (β_1)	0.059	25.093	0.000
TAT (X_2)	0.093 (β_2)	0.019	4.876	0.003
EM (X_3)	0.060 (β_3)	0.008	7.842	0.000
Multiple Correlation Coefficient *R* = 0.996	Coefficient of Determination *R*-Square = 0.992	Adjusted *R*-Square = 0.989	Standard Error of the Estimate = 0.00453	ANOVA *F* - Statistic = 260.288 Sig. 0.000

Table 8. ***Summary of Results of Regression Model***

Hypothesis	**HPCL**	**IOCL**	**GAIL**
1	H_{01} – Rejected	H_{01} – Rejected	H_{01} – Rejected
	H_{a1} – Not Rejected	H_{a1} – Not Rejected	H_{a1} – Not Rejected
2	H_{02} – Not Rejected	H_{02} – Rejected	H_{02} – Rejected
	H_{a2} – Rejected	H_{a2} – Not Rejected	H_{a2} – Not Rejected
3	H_{03} – Not Rejected	H_{03} – Rejected	H_{03} – Rejected
	H_{a3} – Rejected	H_{a3} – Not Rejected	H_{a3} – Not Rejected

Figure 4. ***Performance Evaluation through ROE***

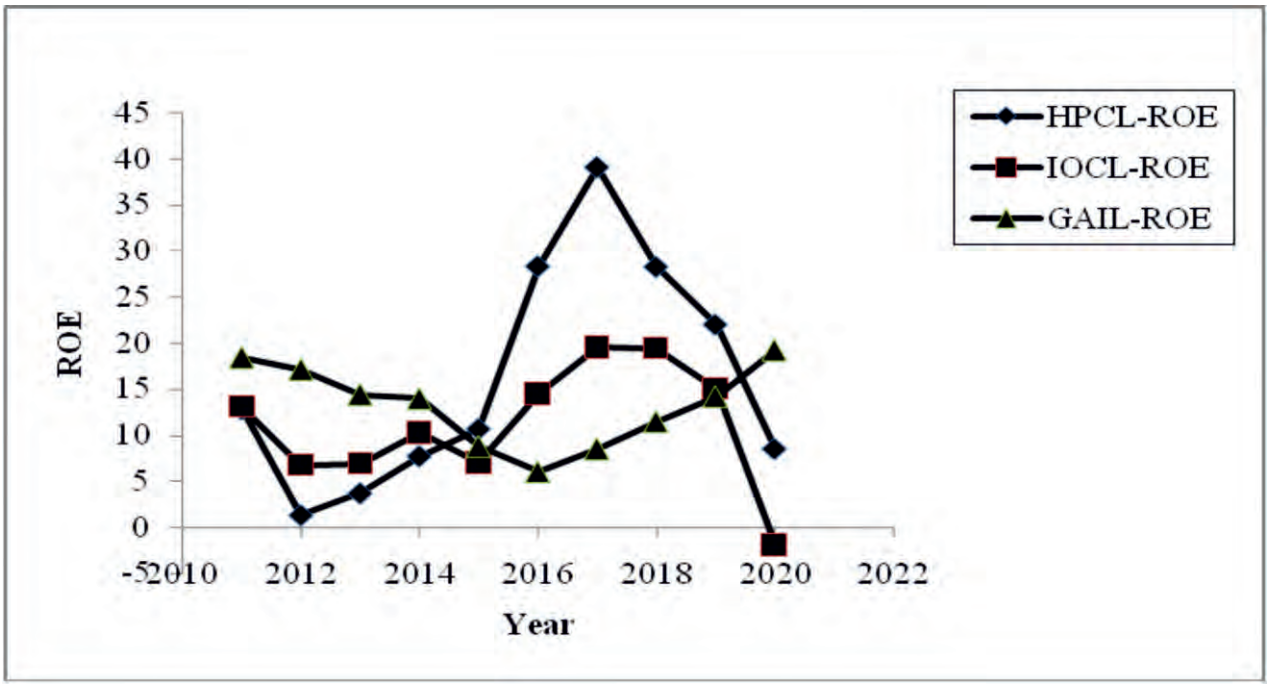

Table 8 consolidates the results of the multiple linear regression model run to analyze the hypotheses. The model reveals that the independent variable NPM has a significant impact over the dependent variable ROE concerning all the three companies. A significant impact of TAT and EM on ROE is noticed in IOCL and GAIL, which is absent in the case of HPCL.

Firms with higher ROE typically have competitive advantages over their peers, translating into superior returns for investors. Therefore, it is imperative to study the ROE in terms of DuPont factors.

As per Table 1 and Figure 4, it may be summarized that HPCL recorded a fall of approximately 0.4% in NPM during the study period, whereas IOCL recorded an average drop of 3.09%. A fall in NPM in the case of HPCL and IOCL indicates the inadequacy of cost control measures. On the contrary, GAIL recorded a gain of 1.02 % over the same period. On the other hand, all three companies fared well in asset management. The rise in TAT values during the study period: 0.6 in HPCL, 0.21 in IOCL, and 0.14 in GAIL establish this fact.

Regarding EM, HPCL and GAIL recorded a drop of 1.46 and 0.33, respectively, indicating lesser dependency on debt in their capital structure. On the contrary, an increment of 0.32 in EM of IOCL indicates its increased dependency on debt capital. The overall impact of the above DuPont factors' variations on the ROE of the companies can be summarized as a drop of 4.31% and 15.1% for HPCL and IOCL, respectively, and a gain of 0.8 % in the case of GAIL. The reasons for the companies' financial performance may be attributed to various factors as follows.

Though the petro-retailers HPCL and IOCL own a significant share in the market, their pricing policies are regulated by the Union Government of India. The pricing is more politically oriented than business. As such, the product pricing of these companies does not follow the global trend of crude oil prices. The government compensates for this loss of revenues to a certain extent in the form of subsidies and grants. These paybacks are often delayed, increasing the interest burden and affecting the cost of capital.

One of the reasons for muted growth could be a decline in production from micro, small, and medium scale

industries (MSME) due to demonization in 2016. The total share of MSME in the Indian economy amounts to around 30% of GDP. Loss of production in MSME results in lesser fuel consumption, thus affecting the revenue of the fuel companies. Added is the employment loss in these industries. Loss of employment always results in reduced fuel consumption, which again contributes to the loss of revenue to fuel trading companies. It is reflected in the fall of ROE of IOCL and HPCL from 2017 till the end of the study period.

On the other hand, the ROE of GAIL, the company that mainly trades gas, continues to grow as the consumption of gas and related products remains more or less constant. Another reason for the drop in revenue of fuel trading companies is the COVID-19 lockdown in 2020 and 2021, which gravely impaired fuel consumption. A report says that the fuel demand fell by 45.8% in April 2020, and it was projected that the fuel demand in the country would decline by 5.6 % for the business year 2020–21. The loss of revenue and hence the loss of ROE for these two companies can be seen in Figure 4. On the contrary, GAIL has recorded steady growth in ROE despite setbacks in the economy.

While we could not find an appropriate work done on similar lines concerning the public sector units operating in the fuel and energy sectors, the findings of Bothra and Gupta (2020) need a special mention for comparing the outcomes of the present work. Bothra and Gupta (2020) identified the major contributor to the ROE as the asset turnover ratio using DuPont analysis in luxury and non-luxury industries. The present study identifies the NPM as the major contributor to the ROE. The latest literature (Chitta et al., 2019) identified that the Maharatna companies are not performing as per expectations. This is in contrast to the results obtained in the present work. The present study identifies GAIL to be the best performing public sector enterprise as far as the ROE is concerned during the same period.

Managerial Implications

ROE is one of the key indicators which attract potential investors who look at only the absolute value of ROE and plan their investment. But for management, a mere absolute value of the metric is not very useful. It has to identify the main contributor to the ROE such that necessary corrective measures may be initiated to enhance ROE and hence strengthen the investors' faith. The present study identifies the NPM to be the most influencing factor on the ROE of all the select companies. The findings show that better strategic control is needed over the direct and indirect expenses incurred by the companies to enhance ROE.

Conclusion

ROE being a measure of a company's ability to attract investors to contribute to its capital structure, this study has been carried out to evaluate the financial performance of three fuel trading companies: HPCL, IOCL, and GAIL, for a period between 2011 and 2020. Financial analysis of the companies' data reveals that HPCL and IOCL recorded a loss of 4.31% and 15.1%, respectively, in ROE throughout the study. Of the three companies studied, GAIL has recorded an increment of 0.8% in ROE over the same period. The main contributor to ROE is found to be NPM, with a regression coefficient of 8.982, 6.668, and 1.475 for HPCL, IOCL, and GAIL, respectively. A high degree of negative correlation is found between NPM and EM in HPCL and IOCL ; whereas, a low degree of positive correlation is found between NPM and TAT in the case of GAIL. The consolidated performance evaluation endorses GAIL to be a favored company for investors, with a net growth of 0.8% in ROE, indicating better management practices.

Limitations of the Study and Scope for Future Research

- The study is confined to 10 years, from 2010 – 11 to 2019 – 2020; hence, the analysis only applies to this period.
- The study covers only three CPSEs in the energy and fuel sector.
- The study is based on the secondary data derived from the annual reports published on the official websites of the CPSEs. Hence, the reliability of the findings is subject to the correctness of the data incorporated in the annual reports.
- The study is based on ratio analysis, which has its shortcomings.

As a future scope of the work, the study can be extended to other public and private sector companies operating in any industry and also for the future study periods as well.

Authors' Contribution

This work is carried out as a part of research work for obtaining a doctorate by Sreevidya Hothur under the guidance of Dr. K. Jayachandra Reddy. Dr. K. Jayachandra Reddy developed the conceptual and qualitative framework of the work. Sreevidya Hothur extracted the data for the study from the financial statements, carried out the computational work, and scripted the article under the supervision of Dr. K. Jayachandra Reddy.

Conflict of Interest

The authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

Funding Acknowledgement

The authors received no financial support for the research, authorship, and/or the publication of this article.

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